0



SEQUENCE LISTING

*/RADEMAN
<110 > Polyak, Kornelia
 Vogelstein, Bert
 Kinzler, Kenneth

<120> Subtle Mitochondrial Mutations as Tumor Markers

RECEIVED

MAY 0 8 2002

TECH CENTER 1600/2900

1800

1860

RECEIVEL.

TECH CENTER 1600/9300

<130> 1107.82346 -

<140> 09/377,856 <141> 1999-08-20

-150- 06/097 307

<150> 06/097,307 <151> 1998-08-20

<160> 1

<170> FastSEQ for Windows Version 3.0

<210> 1

<400> 1

<211> 16569

<212> DNA

<213> Homo sapiens

gatcacaggt ctatcaccct attaaccact cacgggagct ctccatgcat ttggtatttt 60 cgtctggggg gtatgcacgc gatagcattg cgagacgctg gagccggagc accctatgtc 120 gcagtatctg tetttgatte etgeeteate etattattta tegeacetae gtteaatatt 180 acaggcgaac atacttacta aagtgtgtta attaattaat gcttgtagga cataataata 240 acaattgaat gtctgcacag ccactttcca cacagacatc ataacaaaaa atttccacca 300 aacccccct ccccgcttc tggccacagc acttaaacac atctctgcca aaccccaaaa 360 acaaagaacc ctaacaccag cctaaccaga tttcaaattt tatcttttgg cggtatgcac 420 ttttaacagt cacccccaa ctaacacatt attttcccct cccactccca tactactaat 480 ctcatcaata caacccccgc ccatcctacc cagcacacac acaccgctgc taaccccata 540 ccccgaacca accaaaccc aaagacaccc cccacagttt atgtagctta cctcctcaaa 600 gcaatacact gaaaatgttt agacgggctc acatcacccc ataaacaaat aggtttggtc 660 ctagcctttc tattagctct tagtaagatt acacatgcaa gcatccccgt tccagtgagt 720 tcaccctcta aatcaccacg atcaaaaggg acaagcatca agcacgcagc aatgcagctc 780 aaaacgctta gcctagccac acccccacgg gaaacagcag tgattaacct ttagcaataa 840 900 acgaaagttt aactaagcta tactaacccc agggttggtc aatttcgtgc cagccaccgc ggtcacacga ttaacccaag tcaatagaag ccggcgtaaa gagtgtttta gatcacccc 960 tccccaataa agctaaaact cacctgagtt gtaaaaaact ccagttgaca caaaatagac 1020 tacgaaagtg gctttaacat atctgaacac acaatagcta agacccaaac tgggattaga 1080 taccccacta tgcttagccc taaacctcaa cagttaaatc aacaaaactg ctcgccagaa 1140 1200 cactacgage cacagettaa aacteaaagg acetggeggt getteatate eetetagagg agectgttet gtaategata aacceegate aaceteacea cetettgete ageetatata 1260 ccgccatctt cagcaaaccc tgatgaaggc tacaaagtaa gcgcaagtac ccacgtaaag 1320 acgttaggtc aaggtgtagc ccatgaggtg gcaagaaatg ggctacattt tctaccccag 1380 aaaactacga tagcccttat gaaacttaag ggtcgaaggt ggatttagca gtaaactaag 1440 agtagagtgc ttagttgaac agggccctga agcgcgtaca caccgcccgt caccctcctc 1500 aagtatactt caaaggacat ttaactaaaa cccctacgca tttatataga ggagacaagt 1560 cgtaacatgg taagtgtact ggaaagtgca cttggacgaa ccagagtgta gcttaacaca 1620 aagcacccaa cttacactta ggagatttca acttaacttg accgctctga gctaaaccta 1680 gccccaaacc cactccacct tactaccaga caaccttagc caaaccattt acccaaataa 1740

agtataggcg atagaaattg aaacctggcg caatagatat agtaccgcaa gggaaagatg

aaaaattata accaagcata atatagcaag gactaacccc tataccttct gcataatgaa

ttaactagaa ataactttgc aaggagagcc aaagctaaga cccccgaaac cagacgagct 1920 1980 acctaagaac agctaaaaga gcacacccgt ctatgtagca aaatagtggg aagatttata ggtagaggcg acaaacctac cgagcctggt gatagctggt tgtccaagat agaatcttag 2040 2100 ttcaacttta aatttgccca cagaaccctc taaatcccct tgtaaattta actgttagtc caaagaggaa cagctctttg gacactagga aaaaaccttg tagagagagt aaaaaattta 2160 acacccatag taggcctaaa agcagccacc aattaagaaa gcgttcaagc tcaacaccca 2220 ctacctaaaa aatcccaaac atataactga actcctcaca cccaattgga ccaatctatc 2280 accctataga agaactaatg ttagtataag taacatgaaa acattctcct ccgcataagc 2340 ctgcgtcaga ttaaaacact gaactgacaa ttaacagccc aatatctaca atcaaccaac 2400 aagtcattat taccctcact gtcaacccaa cacaggcatg ctcataagga aaggttaaaa 2460 aaagtaaaag gaactcggca aatcttaccc cgcctgttta ccaaaaacat cacctctagc 2520 atcaccagta ttagaggcac cgcctgccca gtgacacatg tttaacggcc gcggtaccct 2580 aaccgtgcaa aggtagcata atcacttgtt ccttaaatag ggacctgtat gaatggctcc 2640 acgagggttc agctgtctct tacttttaac cagtgaaatt gacctgcccg tgaagaggcg 2700 2760 ggcataacac agcaagacga gaagacccta tggagcttta atttattaat gcaaacagta cctaacaaac ccacaggtcc taaactacca aacctgcatt aaaaatttcg gttggggcga 2820 cctcggagca gaacccaacc tccgagcagt acatgctaag acttcaccag tcaaagcgaa 2880 ctactatact caattgatcc aataacttga ccaacggaac aagttaccct agggataaca 2940 gcgcaatcct attctagagt ccatatcaac aatagggttt acgacctcga tgttggatca 3000 3060 ggacateceg atggtgeage egetattaaa ggttegtttg tteaaegatt aaagteetae gtgatctgag ttcagaccgg agtaatccag gtcggtttct atctaccttc aaattcctcc 3120 ctgtacgaaa ggacaagaga aataaggcct acttcacaaa gcgccttccc ccgtaaatga 3180 tatcatctca acttagtatt atacccacac ccacccaaga acagggtttg ttaagatggc 3240 agageceggt aategeataa aacttaaaac tttacagtea gaggtteaat teetettett 3300 aacaacatac ccatggccaa cctcctactc ctcattgtac ccattctaat cgcaatggca 3360 ttcctaatgc ttaccgaacg aaaaattcta ggctatatac aactacgcaa aggccccaac 3420 3480 gttgtaggcc cctacgggct actacaaccc ttcgctgacg ccataaaact cttcaccaaa gagococtaa aaccogocac atotaccato accototaca toaccgococ gacottagot 3540 ctcaccateg ctcttctact atgaacccc ctccccatac ccaaccccct ggtcaacctc 3600 aacctaggcc tectatttat tetagecace tetagectag cegtttaete aateetetga 3660 tcagggtgag catcaaactc aaactacgcc ctgatcggcg cactgcgagc agtagcccaa 3720 acaatctcat atgaagtcac cctagccatc attctactat caacattact aataagtggc 3780 tectttaace tetecaceet tateacaaca caagaacace tetgattaet cetgecatea 3840 tgaccettgg ccataatatg atttatetce acactageag agaceaaceg aaccecette 3900 gaccttgccg aaggggagtc cgaactagtc tcaggcttca acatcgaata cgccgcaggc 3960 cccttcgccc tattcttcat agccgaatac acaaacatta ttataataaa caccctcacc 4020 actacaatct tectaggaae aacatatgae geaeteteee etgaaeteta eacaaeatat 4080 tttgtcacca agaccctact tctaacctcc ctgttcttat gaattcgaac agcatacccc 4140 4200 cgattccgct acgaccaact catacacctc ctatgaaaaa acttcctacc actcacccta gcattactta tatgatatgt ctccataccc attacaatct ccagcattcc ccctcaaacc 4260 taagaaatat gtctgataaa agagttactt tgatagagta aataatagga gcttaaaccc 4320 ccttatttct aggactatga gaatcgaacc catccctgag aatccaaaat tctccgtgcc 4380 acctatcaca ccccatccta aagtaaggtc agctaaataa gctatcgggc ccataccccg 4440 aaaatgttgg ttataccett ceegtactaa ttaateeeet ggeeeaaeee gteatetaet 4500 ctaccatctt tgcaggcaca ctcatcacag cgctaagctc gcactgattt tttacctgag 4560 taggcctaga aataaacatg ctagctttta ttccagttct aaccaaaaaa ataaaccctc 4620 gttccacaga agctgccatc aagtatttcc tcacgcaagc aaccgcatcc ataatccttc 4680 taatagctat cctcttcaac aatatactct ccggacaatg aaccataacc aatactacca 4740 atcaatactc atcattaata atcataatag ctatagcaat aaaactagga atagccccct 4800 ttcacttctg agtcccagag gttacccaag gcacccctct gacatccggc ctgcttcttc 4860 tcacatgaca aaaactagcc cccatctcaa tcatatacca aatctctccc tcactaaacg 4920 taagcettet ceteactete teaatettat ceateatage aggeagttga ggtggattaa 4980 accagaccca gctacgcaaa atcttagcat actcctcaat tacccacata ggatgaataa 5040 tagcagttct accgtacaac cctaacataa ccattcttaa tttaactatt tatattatcc 5100 taactactac cgcattccta ctactcaact taaactccag caccacgacc ctactactat 5160 ctcgcacctg aaacaagcta acatgactaa caccettaat tecatecace etectetece 5220 5280 taggaggett geoccegeta accegetttt tgeccaaatg ggecattate gaagaattea caaaaaacaa tagcctcatc atccccacca tcatagccac catcaccctc cttaacctct 5340 acttctacct acgcctaatc tactccacct caatcacact actccccata tctaacaacg 5400

taaaaataaa atgacagttt gaacatacaa aacccacccc attcctcccc acactcatcg 5460 cccttaccac gctactccta cctatctccc cttttatact aataatctta tagaaattta 5520 ggttaaatac agaccaagag ccttcaaagc cctcagtaag ttgcaatact taatttctgt 5580 5640 aacagctaag gactgcaaaa ccccactctg catcaactga acgcaaatca gccactttaa ttaagctaag cccttactag accaatggga cttaaaccca caaacactta gttaacagct 5700 aagcacccta atcaactggc ttcaatctac ttctcccgcc gccgggaaaa aaggcgggag 5760 aagccccggc aggtttgaag ctgcttcttc gaatttgcaa ttcaatatga aaatcacctc 5820 ggagctggta aaaagaggcc taacccctgt ctttagattt acagtccaat gcttcactca 5880 gccattttac ctcaccccca ctgatgttcg ccgaccgttg actattctct acaaaccaca 5940 aagacattgg aacactatac ctattattcg gcgcatgagc tggagtccta ggcacagctc 6000 taagcctcct tattcgagcc gagctgggcc agccaggcaa ccttctaggt aacgaccaca 6060 tctacaacgt tatcgtcaca gcccatgcat ttgtaataat cttcttcata gtaataccca 6120 tcataatcgg aggctttggc aactgactag ttcccctaat aatcggtgcc cccgatatgg 6180 cgtttccccg cataaacaac ataagcttct gactcttacc tccctctctc ctactcctgc 6240 6300 tegeatetge tatagtggag geeggageag gaacaggttg aacagtetae ceteeettag cagggaacta ctcccaccct ggagcctccg tagacctaac catcttctcc ttacacctag 6360 6420 caggtgtctc ctctatctta ggggccatca atttcatcac aacaattatc aatataaaac cecetgecat aacecaatae caaacgeece tettegtetg atecgteeta ateacageag 6480 tectaettet ectatetete ceagteetag etgetggeat caetataeta etaacagace 6540 gcaacctcaa caccaccttc ttcgaccccg ccggaggagg agaccccatt ctataccaac 6600 acctattctg atttttcggt caccctgaag tttatattct tatcctacca ggcttcggaa 6660 taatctccca tattgtaact tactactccg gaaaaaaaga accatttgga tacataggta 6720 tggtctgagc tatgatatca attggcttcc tagggtttat cgtgtgagca caccatatat 6780 ttacagtagg aatagacgta gacacacgag catatttcac ctccgctacc ataatcatcg 6840 ctatccccac cggcgtcaaa gtatttagct gactcgccac actccacgga agcaatatga 6900 aatgatetge tgeagtgete tgageeetag gatteatett tetttteace gtaggtggee 6960 tgactggcat tgtattagca aactcatcac tagacatcgt actacacgac acgtactacg 7020 ttgtagccca cttccactat gtcctatcaa taggagctgt atttgccatc ataggaggct 7080 tcattcactg atttccccta ttctcaggct acaccctaga ccaaacctac gccaaaatcc 7140 atttcactat catattcatc ggcgtaaatc taactttctt cccacaacac tttctcggcc 7200 tatccggaat gccccgacgt tactcggact accccgatgc atacaccaca tgaaacatcc 7260 tatcatctgt aggctcattc atttctctaa cagcagtaat attaataatt ttcatgattt 7320 gagaageett egettegaag egaaaagtee taatagtaga agaaceetee ataaaeetgg 7380 agtgactata tggatgcccc ccaccctacc acacattcga agaacccgta tacataaaat 7440 ctagacaaaa aaggaaggaa tcgaaccccc caaagctggt ttcaagccaa ccccatggcc 7500 tccatgactt tttcaaaaag gtattagaaa aaccatttca taactttgtc aaagttaaat 7560 tataggotaa atootatata tottaatggo acatgoagog caagtaggto tacaagaogo 7620 tacttcccct atcatagaag agcttatcac ctttcatgat cacgccctca taatcatttt 7680 7740 cettatetge tteetagtee tgtatgeeet ttteetaaca eteacaacaa aactaactaa 7800 tactaacatc tcagacgctc aggaaataga aaccgtctga actatcctgc ccgccatcat 7860 cctagtcctc atcgccctcc catccctacg catcctttac ataacagacg aggtcaacga tecetecett accateaaat caattggeea ecaatggtae tgaacetaeg agtacaeega 7920 ctacggcgga ctaatcttca actcctacat acttccccca ttattcctag aaccaggcga 7980 cctgcgactc cttgacgttg acaatcgagt agtactcccg attgaagccc ccattcgtat 8040 aataattaca tcacaagacg tcttgcactc atgagctgtc cccacattag gcttaaaaac 8100 agatgcaatt cccggacgtc taaaccaaac cactttcacc gctacacgac cgggggtata 8160 ctacggtcaa tgctctgaaa tctgtggagc aaaccacagt ttcatgccca tcgtcctaga 8220 8280 attaattccc ctaaaaatct ttgaaatagg gcccgtattt accctatagc accccctcta ccccctctag agcccactgt aaagctaact tagcattaac cttttaagtt aaagattaag 8340 agaaccaaca cctctttaca gtgaaatgcc ccaactaaat actaccgtat ggcccaccat 8400 8460 aattaccccc atactcctta cactattcct catcacccaa ctaaaaatat taaacacaaa 8520 ctaccaccta cctccctcac caaagcccat aaaaataaaa aattataaca aaccctgaga accaaaatga acgaaaatct gttcgcttca ttcattgccc ccacaatcct aggcctaccc 8580 8640 geogragiae tgateattet atttececet etattgatee ecacetecaa atateteate aacaaccgac taatcaccac ccaacaatga ctaatcaaac taacctcaaa acaaatgata 8700 accatacaca acactaaagg acgaacctga tctcttatac tagtatcctt aatcattttt 8760 8820 attgccacaa ctaacctcct cggactcctg cctcactcat ttacaccaac cacccaacta tctataaacc tagccatggc catcccctta tgagcgggca cagtgattat aggctttcgc 8880 tctaagatta aaaatgccct agcccacttc ttaccacaag gcacacctac accccttatc 8940 cccatactag ttattatcga aaccatcagc ctactcattc aaccaatagc cctggccgta 9000 cgcctaaccg ctaacattac tgcaggccac ctactcatgc acctaattgg aagcgccacc 9060 ctagcaatat caaccattaa ccttccctct acacttatca tcttcacaat tctaattcta 9120 ctgactatcc tagaaatcgc tgtcgcctta atccaagcct acgttttcac acttctagta 9180 agectetace tgcacgacaa cacataatga eccaccaate acatgeetat catatagtaa 9240 aacccagccc atgaccccta acaggggccc tctcagccct cctaatgacc tccggcctag 9300 ccatgtgatt tcacttccac tccataacgc tcctcatact aggcctacta accaacac 9360 taaccatata ccaatgatgg cgcgatgtaa cacgagaaag cacataccaa ggccaccaca 9420 9480 caccacctgt ccaaaaaggc cttcgatacg ggataatcct atttattacc tcagaagttt ttttcttcgc aggatttttc tgagcctttt accactccag cctagcccct acccccaat 9540 taggagggca ctggccccca acaggcatca ccccgctaaa tcccctagaa gtcccactcc 9600 taaacacatc cgtattactc gcatcaggag tatcaatcac ctgagctcac catagtctaa 9660 tagaaaacaa ccgaaaccaa ataattcaag cactgcttat tacaatttta ctgggtctct 9720 attttaccct cctacaagcc tcagagtact tcgagtctcc cttcaccatt tccgacggca 9780 tctacggctc aacatttttt gtagccacag gcttccacgg acttcacgtc attattggct 9840 caactttcct cactatctgc ttcatccgcc aactaatatt tcactttaca tccaaacatc 9900 actttggctt cgaagccgcc gcctgatact ggcattttgt agatgtggtt tgactatttc 9960 tgtatgtctc catctattga tgagggtctt actcttttag tataaatagt accgttaact 10020 10080 tccaattaac tagttttgac aacattcaaa aaagagtaat aaacttcgcc ttaattttaa taatcaacac cctcctagcc ttactactaa taattattac attttgacta ccacaactca 10140 acggctacat agaaaaatcc accccttacg agtgcggctt cgaccctata tcccccgccc 10200 10260 gcgtcccttt ctccataaaa ttcttcttag tagctattac cttcttatta tttgatctag aaattgccct ccttttaccc ctaccatgag ccctacaaac aactaacctg ccactaatag 10320 ttatgtcatc cctcttatta atcatcatcc tagccctaag tctggcctat gagtgactac 10380 aaaaaggatt agactgaacc gaattggtat atagtttaaa caaaacgaat gatttcgact 10440 cattaaatta tgataatcat atttaccaaa tgcccctcat ttacataaat attatactag 10500 catttaccat ctcacttcta ggaatactag tatatcgctc acacctcata tcctccctac 10560 tatgcctaga aggaataata ctatcgctgt tcattatagc tactctcata accctcaaca 10620 cccactccct cttagccaat attgtgccta ttgccatact agtctttgcc gcctgcgaag 10680 cagcggtggg cctagcccta ctagtctcaa tctccaacac atatggccta gactacgtac 10740 ataacctaaa cctactccaa tgctaaaact aatcgtccca acaattatat tactaccact 10800 gacatgactt tccaaaaaac acataatttg aatcaacaca accacccaca gcctaattat 10860 tagcatcatc cctctactat tttttaacca aatcaacaac aacctattta gctgttcccc 10920 aacettttcc tecgaceece taacaaceec cetectaata etaactaeet gaeteetaee 10980 cctcacaatc atggcaagcc aacgccactt atccagtgaa ccactatcac gaaaaaaact 11040 ctacctctct atactaatct ccctacaaat ctccttaatt ataacattca cagccacaga 11100 actaatcata ttttatatct tcttcgaaac cacacttatc cccaccttgg ctatcatcac 11160 ccgatgaggc aaccagccag aacgcctgaa cgcaggcaca tacttcctat tctacaccct 11220 agtaggetee etteceetae teategeaet aatttacaet cacaacaeee taggeteaet 11280 aaacattcta ctactcactc tcactgccca agaactatca aactcctgag ccaataactt 11340 11400 aatatgacta gettacacaa tagettttat agtaaagata eetetttaeg gaeteeaett atgactccct aaagcccatg tcgaagcccc catcgctggg tcaatagtac ttgccgcagt 11460 actottaaaa ctaggoggot atggtataat acgootcaca ctcattotca accooctgac 11520 aaaacacata gcctacccct tccttgtact atccctatga ggcataatta taacaagctc 11580 catctgccta cgacaaacag acctaaaatc gctcattgca tactcttcaa tcagccacat 11640 11700 agccctcgta gtaacagcca ttctcatcca aaccccctga agcttcaccg gcgcagtcat tctcataatc gcccacgggc ttacatcctc attactattc tgcctagcaa actcaaacta 11760 cgaacgcact cacagtcgca tcataatcct ctctcaagga cttcaaactc tactcccact 11820 aatagetttt tgatgaette tageaageet egetaacete geettaeeee eeactattaa 11880 cctactggga gaactctctg tgctagtaac cacgttctcc tgatcaaata tcactctcct 11940 12000 acttacagga ctcaacatac tagtcacage ectatactee etetacatat ttaccacaac 12060 acaatggggc tcactcaccc accacattaa caacataaaa ccctcattca cacgagaaaa 12120 cacceteatg tteatacace tatececeat tetecteeta teceteaace ecgacateat 12180 taccgggttt tcctcttgta aatatagttt aaccaaaaca tcagattgtg aatctgacaa cagaggetta egacecetta tttacegaga aageteacaa gaactgetaa eteatgeece 12240 catgtctaac aacatggctt tctcaacttt taaaggataa cagctatcca ttggtcttag 12300 12360 gccccaaaaa ttttggtgca actccaaata aaagtaataa ccatgcacac tactataacc accctaaccc tgacttccct aattcccccc atccttacca ccctcgttaa ccctaacaaa 12420 aaaaactcat acccccatta tgtaaaatcc attgtcgcat ccacctttat tatcagtctc 12480

ttccccacaa caatattcat gtgcctagac caagaagtta ttatctcgaa ctgacactga 12540 gccacaaccc aaacaaccca gctctcccta agcttcaaac tagactactt ctccataata 12600 ttcatccctg tagcattgtt cgttacatgg tccatcatag aattctcact gtgatatata 12660 aactcagacc caaacattaa tcagttcttc aaatatctac tcatcttcct aattaccata 12720 12780 ctaatcttag ttaccgctaa caacctattc caactgttca tcggctgaga gggcgtagga 12840 attatatect tettgeteat cagttgatga tacgeeegag cagatgeeaa cacageagee attcaagcaa tootatacaa cogtatoggo gatatoggtt toatcotogo ottagcatga 12900 tttatcctac actccaactc atgagaccca caacaaatag cccttctaaa cgctaatcca 12960 agcctcaccc cactactagg cctcctccta gcagcagcag gcaaatcagc ccaattaggt 13020 ctccacccct gactcccctc agccatagaa ggccccaccc cagtctcagc cctactccac 13080 tcaagcacta tagttgtagc aggaatcttc ttactcatcc gcttccaccc cctagcagaa 13140 aatageceae taatecaaae tetaaeaeta tgettaggeg etateaeeae tetgttegea 13200 gcagtctgcg cccttacaca aaatgacatc aaaaaaatcg tagccttctc cacttcaagt 13260 caactaggac tcataatagt tacaatcggc atcaaccaac cacacctagc attcctgcac 13320 atctgtaccc acgccttctt caaagccata ctatttatgt gctccgggtc catcatccac 13380 aaccttaaca atgaacaaga tattcgaaaa ataggaggac tactcaaaac catacctctc 13440 acttcaacct ccctcaccat tggcagccta gcattagcag gaataccttt cctcacaggt 13500 ttctactcca aagaccacat catcgaaacc gcaaacatat catacacaaa cgcctgagcc 13560 ctatctatta ctctcatcgc tacctccctg acaagcgcct atagcactcg aataattctt 13620 ctcaccctaa caggtcaacc tcgcttcccc acccttacta acattaacga aaataacccc 13680 accctactaa accccattaa acgcctggca gccggaagcc tattcgcagg atttctcatt 13740 actaacaaca tttcccccgc atccccttc caaacaacaa tccccctcta cctaaaactc 13800 acageceteg etgteaettt eetaggaett etaacageee tagaeeteaa etaeetaaee 13860 aacaaactta aaataaaatc cccactatgc acattttatt tctccaacat actcggattc 13920 taccctagca tcacacaccg cacaatcccc tatctaggcc ttcttacgag ccaaaacctg 13980 cccctactcc tcctagacct aacctgacta gaaaagctat tacctaaaac aatttcacag 14040 caccaaatct ccacctccat catcacctca acccaaaaag gcataattaa actttacttc 14100 ctctctttct tcttcccact catcctaacc ctactcctaa tcacataacc tattcccccg 14160 agcaatctca attacaatat atacaccaac aaacaatgtt caaccagtaa ctactactaa 14220 tcaacgccca taatcataca aagcccccgc accaatagga tcctcccgaa tcaaccctga 14280 14340 cccctctcct tcataaatta ttcagcttcc tacactatta aagtttacca caaccaccac cccatcatac tettteacce acageaceaa tectacetee ategetaace ecaetaaaac 14400 actcaccaag acctcaaccc ctgaccccca tgcctcagga tactcctcaa tagccatcgc 14460 tgtagtatat ccaaagacaa ccatcattcc ccctaaataa attaaaaaaa ctattaaacc 14520 catataacct cccccaaaat tcagaataat aacacacccg accacaccgc taacaatcaa 14580 tactaaaccc ccataaatag gagaaggctt agaagaaaac cccacaaacc ccattactaa 14640 acccacacte aacagaaaca aagcatacat cattattete geaeggaeta caaccaegae 14700 caatgatatg aaaaaccatc gttgtatttc aactacaaga acaccaatga ccccaatacg 14760 caaaattaac cccctaataa aattaattaa ccactcattc atcgacctcc ccaccccatc 14820 caacatetee geatgatgaa aetteggete aeteettgge geetgeetga teeteeaaat 14880 caccacagga ctattcctag ccatgcacta ctcaccagac gcctcaaccg ccttttcatc 14940 aatcgccac atcactcgag acgtaaatta tggctgaatc atccgctacc ttcacgccaa 15000 tggcgcctca atattcttta tctgcctctt cctacacatc gggcgaggcc tatattacgg 15060 atcatttctc tactcagaaa cctgaaacat cggcattatc ctcctgcttg caactatagc 15120 aacagcette ataggetatg teeteeegtg aggecaaata teattetgag gggecacagt 15180 aattacaaac ttactatccg ccatcccata cattgggaca gacctagttc aatgaatctg 15240 aggaggctac tcagtagaca gtcccaccct cacacgattc tttacctttc acttcatctt 15300 gcccttcatt attgcagccc tagcaacact ccacctccta ttcttgcacg aaacgggatc 15360 aaacaacccc ctaggaatca cctcccattc cgataaaatc accttccacc cttactacac 15420 aatcaaagac gccctcggct tacttctctt ccttctctc ttaatgacat taacactatt 15480 ctcaccagac ctcctaggcg acccagacaa ttatacccta gccaacccct taaacacccc 15540 tececacate aageeegaat gatattteet attegeetae acaattetee gateegteee 15600 15660 taacaaacta ggaggcgtcc ttgccctatt actatccatc ctcatcctag caataatccc 15720 catcctccat atatccaaac aacaaagcat aatatttcgc ccactaagcc aatcacttta ttgactccta gccgcagacc tcctcattct aacctgaatc ggaggacaac cagtaagcta 15780 cccttttacc atcattggac aagtagcatc cgtactatac ttcacaacaa tcctaatcct 15840 15900 aataccaact atctccctaa ttgaaaacaa aatactcaaa tgggcctgtc cttgtagtat aaactaatac accagtettg taaaccggag atgaaaacct ttttccaagg acaaatcaga 15960 16020 gaaaaagtct ttaactccac cattagcacc caaagctaag attctaattt aaactattct

ctgttctttc atggggaagc agatttgggt accacccaag tattgactca cccatcaac	a 16080
acceptatet atttcgtaca ttactgccag ccaccatgaa tattgtacgg taccataaa	t 16140
acttgaccac ctgtagtaca taaaaaccca atccacatca aaaccccctc cccatgctt	a 16200
caagcaagta cagcaatcaa ccctcaacta tcacacatca actgcaactc caaagccac	c 16260
cctcacccac taggatacca acaaacctac ccacccttaa cagtacatag tacataaag	c 16320
catttaccgt acatagcaca ttacagtcaa atcccttctc gtccccatgg atgaccccc	c 16380
teagataggg gteeettgae caccateete egtgaaatea atateeegea caagagtge	t 16440
actetecteg eteegggee ataacaettg ggggtageta aagtgaactg tateegaca	t 16500
ctggttccta cttcagggtc ataaagccta aatagcccac acgttcccct taaataaga	c 16560
	16569
atcacgatg	
	•

. .

.